Preparation Guidelines

for

Submitting Plans to

Utah Department of Transportation

For the Purposes of Publishing to the Online

Electronic Plan Room

Revised February 28, 2003

Introduction

UDOT is in the process of creating and implementing a system whereby plans and documentation for projects pending advertisement may be retrieved via the Internet using the *Internet Explorer* web browser. At the current time, this system is still under development and will soon be moving into the testing phase where selected potential end-users will be invited to access the system and offer evaluations and suggestions.

For the purposes of this document, this system will be referred to as the *Electronic Plan Room*, or "EPR" for short.

The mechanism for publishing plan sets into this system is part of UDOT's production plotting software, *InterPlot*, commonly referred to as "iPlot", from Bentley Systems, Inc., who also provides our CADD software *MicroStation* and *InRoads*.

Most UDOT engineering personnel are familiar with the use of iPlot's *Organizer*, which can be used to create a batch of plan sheets to be plotted at one time, and this is the component used to publish a complete set of CADD drawings for a specific project into the EPR. However, certain procedures must be observed to ensure a smooth transition of the project plan sets into the EPR, and these will be discussed here.

Consulting firms must also prepare to deal with these issues. As is already required, the projects must be delivered to UDOT on CD's in the established project directory structure, including all information required to produce plots via the *iPlot Organizer* software. This includes all reference files, font and linestyle resource files. Note that the standard UDOT border files have in them a certain shape which *iPlot* recognizes to define the area to be plotted such that it registers correctly on the 11x17 page size.

One key element required for submittal is the *iPlot Organizer* plot-set file, *filename.ips*. The remainder of this document will serve to describe the requirements and procedures for preparing this file. Note that at one point the plot names in the *Organizer* must be renamed and ordered according to the UDOT document *Plan Sheet Codes and Descriptions*, which can be obtained from the UDOT website here:

http://www.udot.utah.gov/esd/2002Standards/Drawings/pdffiles/PlanSheetCodes.pdf

InterPlot Software Configuration

In order for the iPlot Organizer application to properly render CADD drawings, either in hard-copy form or in the EPR, and with a minimum of intervention during the above steps, UDOT has developed the following method for launching the application. Note that most files mentioned are project-specific, and all reside within the project folder.

- A batch file (nnnnn_yy_Iplot.bat) starts the process, and contains several key iPlot variables, one of which specifies which MicroStation project configuration file (PCF) to use. This resides in the project's /Resources/iParm folder.
- The PCF (nnnnn_yy.pcf) contains several variables that direct both MicroStation and iPlot to use specific resources, including linestyles, fonts, reference files, etc., and also several key iPlot variables. Note that the presence of these iPlot variables in the PCF allow the iPlot Dialog interface (accessed from within a MicroStation session) to function similarly to the iPlot Organizer application. This resides in the project's /Resources/Applications folder. A copy of this PCF must reside in the user's MicroStation workspace
- The iPlot settings file (iPlot.set) contains initial settings for processing CADD files either individually or as groups. This is very useful for automating the process of setting all parameters to produce correct plots. This specifies, among other things, the pen table, color table and plot-area (a rectangle indicating what area to plot – resides on the border drawings). The location of this file is specified in the iPlot variables within the PCF. This resides in the project's /Resources/iParm folder.
- The pen table (Udot.pen) controls, among other things, the thickness of lines based on their MicroStation "weights" and gray-scaling of some information. This resides in the project's /Resources/iParm folder.
- The batch file also executes a registration-entry file (iplotorg.reg) which directs iPlot Organizer where to start looking for files to add. This is not necessary, but only a convenience. This resides in the project's /Resources/iParm folder.
- Note that with the exception of the PCF, these files reside in the projects /resources/iParm folder.

Notes on figures

Figure 1 - Run InterPlot Organizer:
The projects folders, as created by UDOT's *CADD Utility Program*, contain certain files that control how iPlot processes each plan sheet to produce the plots. These include:

ip.cfg	provides basic configuration, chiefly where to find settings file
iplot.cfg	provides detailed configuration, including where to find reference files
iplot.set	provides initial settings for iPlot, such as workspace, plot area, non-plot levels
udot.pen	provides plot symbolization, such as line thicknesses, gray-scaling

Figure 2 – Create Plot Set:
For best results, choose a printer that supports 11x17. UDOT's typical printer is the Hewlett-Packard LaserJet 8100. When the project is actually published to the EPR, the correct printer will be specified. Note that since you can either create a new plot set or open an existing, this means that the plot set can be created in phases, not needing to be done in one session. Note that the ultimate name of the plot set will be the project number.

Figure 3 – Verify Printer and Settings File:
Ensure that the correct settings file has been located. Ensure that the correct printer has been selected. If not, go to the menu and select File/Print Setup to select the appropriate printer. Note that when UDOT staff ultimately publishes the plan set to the EPR, a special printer on the iPlot server will be used.

Figure 4 – Select Files:
No notes at this time.

Figure 5 – Check Plot Set:
It is extremely important that this phase of processing the individual plan sheets goes through with no errors, since most errors will result in a less-than-perfect final rendition of the plan sheet, either in printed form or in the EPR. Take whatever steps are necessary to achieve an error-free process. Please see the section titled "Problems Frequently Encountered" later in this document.

Figure 6 – Rename Plot Names:
Note that upon initial processing of the plan sheets, the "Plot Name" in the left-most column will be the same as each plan sheet's filename without the extension. In most cases, the filename will not conform to the standard sheet-naming convention as outlined in the UDOT document *Plan Sheet Codes and Descriptions* (see above), even though the sheet's title block should have this designation. But for the sake of consistency, the actual published plan sets must follow this convention, and this is where it can be controlled.

Figure 7 – Organize Sheets:
As with the naming convention, it is very important that all the plan sheets appear in the correct order. Usually the process of selecting the files (Figure 4) does not guarantee the order. The correct order is specified in the UDOT document *Plan Sheet Codes and Descriptions* (see above).

Figure 8 – Save the Plan Set:
As noted, the plot set must be saved with the name equal to the project number. This is how the individual plan sets will be stored and retrieved from the EPR. Also please note that, due to Homeland Security issues, there has been a directive that the general public should not have direct access to details of structure plans. For this reason, as noted, projects with structure plan sets must have two plot sets created, one with full structure plans, the other with only structures sheet 1's. As noted, the full sets will have the suffix "_str" after the normal project number. Also please note that the plot set file has an extension of ".ips".

It is recommended that the plot set be printed in hard-copy form to ensure that each sheet will appear correctly, with correct orientation on the sheet and correct symbology, including fonts, linestyles and line weights. Again, take whatever steps are necessary to achieve an error-free process.

- # Electronic Plan Room – Plan Preparation

Allowable File Types for Iplot

- MicroStation DGN Files (*.dgn)
- IPARM Files (*.i)
- AutoCAD DWG Files (*.dwg)
- APARM Files (*.apm)
- JPEG – JFIF Compliant (*.jpg)
- TIF – Tagged Image File Format (*.tif)
- CALS – G4 Compliant (*.cal)
- Intergraph Raster (*.ims;*.cit;*.cot;*.crl;*.rgb;*.rle;*.tg4)
- RPARM Files (*.rpm)
- TGA – Truevision Targa (*.tga)
- PCX – Zsoft Paintbrush (*.bmp;*.pcx)
- InterPlot Digital Print Archive (*.dpr)
- DPARM Files (*.dpm)

Problems Frequently Encountered

- Printable area changes
    - Print drivers vary
    - Form name changes (11x17 vs. Tabloid)
- Resource mapping not same as project resource file
- Missing reference files
    - Base file created in non standard directory (not in search path)
    - Correct iplot.cfg file active
    - Setting save full path in reference manager
    - Referencing a temporary file that is deleted
- Compiling project data – Project directory containing files from all disciplines
    - All disciplines need to use same base files and file naming convention
    - All disciplines need to use same resource files (seed, line styles, etc.)
    - All disciplines use same directory structure and base project name (1843_01 vs. 1843_02)
- File changed in MicroStation but not updated in InterPlot Organizer
    - Levels turned on or off
    - Reference files attached or detached
    - View attributes changed
    - Border location moved
- Elements placed in drawing not showing in Iplot
    - Iplot.set file turns off levels 61-63
    - Iplot.set file does not display construction elements, enter data fields, reference boundaries, or text nodes
    - Elements placed on elevations outside of saved display depth
- Print area not found
    - Non standard border used
        - Iplot default looks for shape on level 61, color 44, weight 0, line style 0
    - Border reference detached or missing

Local Government – Autocad Submittal Requirements

Provide:

- Pen assignments and printing instructions
- All files used to create sheet files
    - Xrefs
    - Text fonts (*.shx, *.ttf, etc.)
- If standard file naming convention not used, provide description of files
- Strip full paths or switch full paths to relative paths. Provide list of required directories to be included in search path.

Iplot Limitations With AutoCAD Support

InterPlot Client/Professional provides extensive AutoCAD Release 10 through 2000 support, including support for hatch entities, lwpolyline entities, application-defined proxy entities, AutoCAD project search paths, and TrueType font display.
InterPlot has a few limitations with regard to plotting AutoCAD drawing files:

- No support for AutoCAD display order. You can work around this issue by using InterPlot's priority resymbolization feature (through the use of pen tables). Refer to the on-line InterPlot Reference help for more information on how to use pen tables.
- Partial support for xref clipping. Clipping in plan views is supported. Non-view-aligned xref clip boundaries in 3D views are not supported.
- Quicktext mode inside MTEXT entities is not supported.
- Plotting of hidden-line or shaded views is not supported.
- Negative DIMGAP values for leader entities are not supported.

Creating a plot set

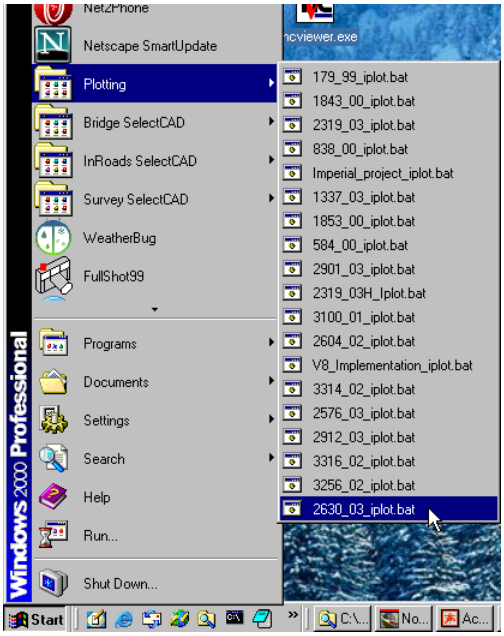

Figure 1 - Run InterPlot Organizer. InterPlot Organizer should always be launched from the batch file created by the CADD Utilities program. This batch file copies configuration files into the program directories that designate the search paths and settings file that are project specific.

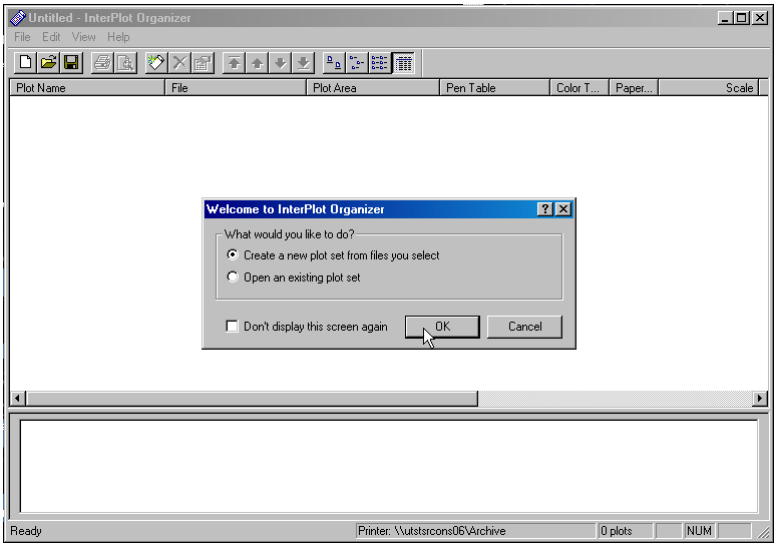

Figure 2 – Create plot set. Once InterPlot Organizer has loaded, make sure the correct printer is selected. Select OK to create a new plot set or click on the "Open an existing plot set" to open a previously created plot set.

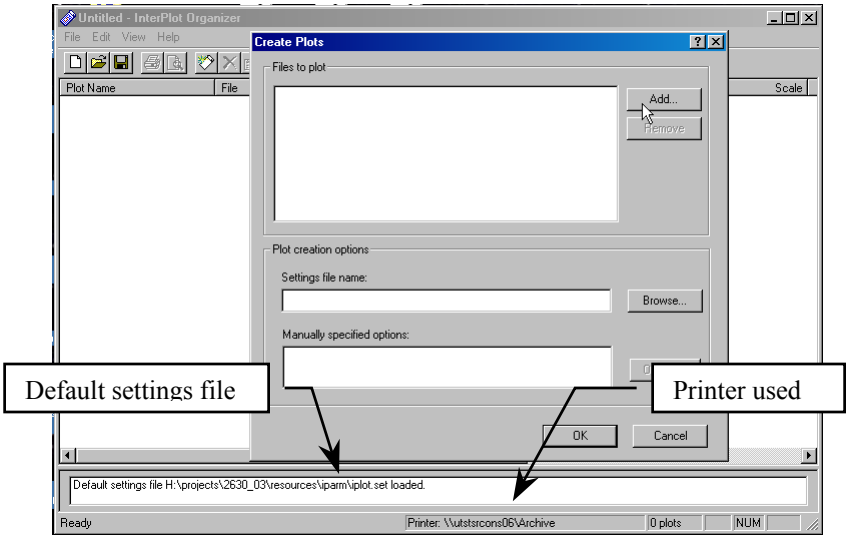

Figure 3 – Verify printer and Settings file. The message area of the program displays the settings file that will be used as default by the program. The printer that is being used for the plot set is displayed at the bottom of the dialog box. Click on Add… to start selecting files to add to the plot set.

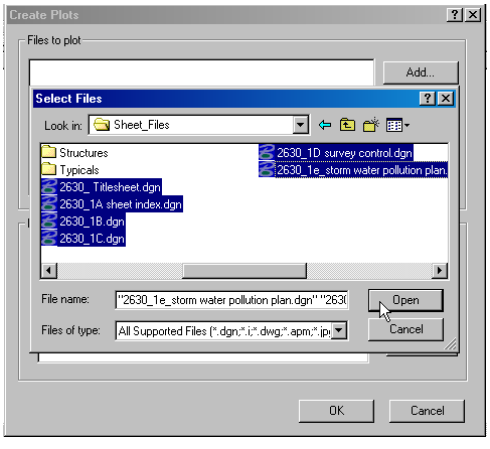

Figure 4 - Select files. Select the files to include in the plot set and click on Open. Repeat for files in each subdirectory.

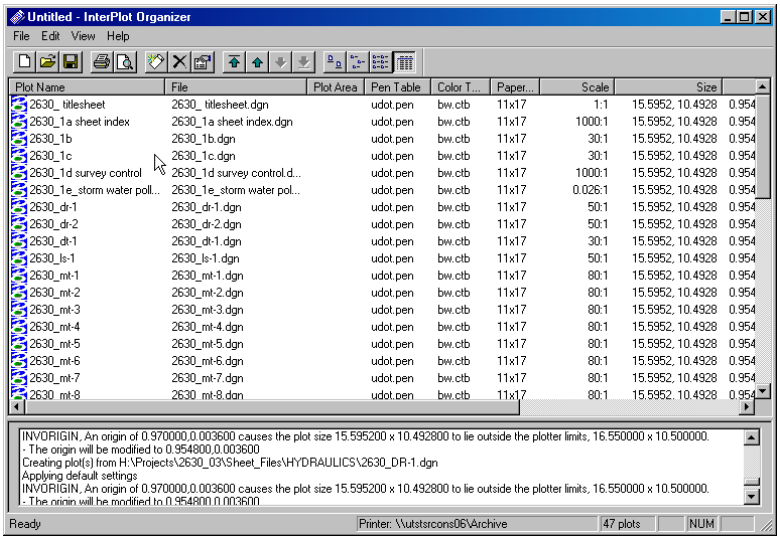

Figure 5 – Check Plot Set. Scroll through the message area to check for errors from missing files or ignored area qualifiers. Check the pen table, paper size, scale, working space, and units columns to verify the correct parameters.

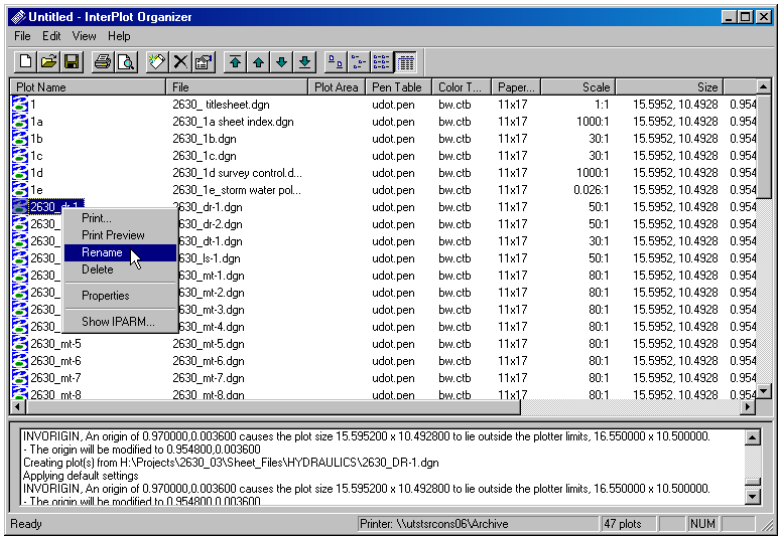

Figure 6 – Rename plot names. Rename plot names to correspond with naming conventions defined in the UDOT document "Plan Sheet Codes and Descriptions". This may be obtained from the UDOT website. See introduction above for the

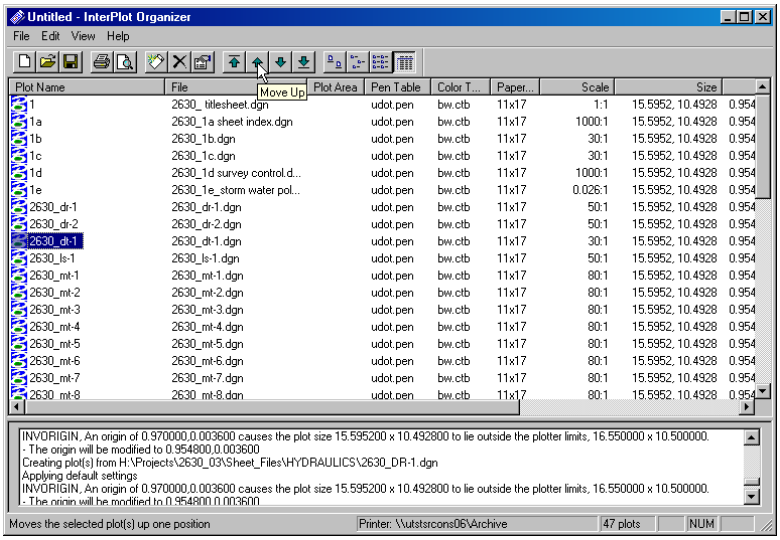

Figure 7 – Organize Sheets. Put the sheet files in the order indexed defined in the UDOT document "Plan Sheet Codes and Descriptions" mentioned in figure 6. Use the arrows at the top of the program to move files up or down.

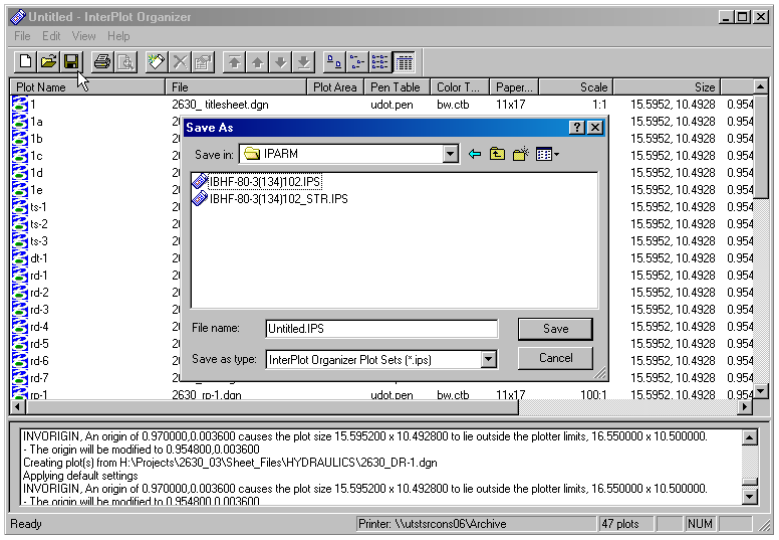

Figure 8 – Save the Plan Set. Save the plan set using the project name. For projects with structure drawings, save two different plot sets. Create one plan set with all roadway sheets and just the sheet 1's of the structure drawings for public use. The second plot set will contain all roadway and structure drawings and will have _STR added to the file name.